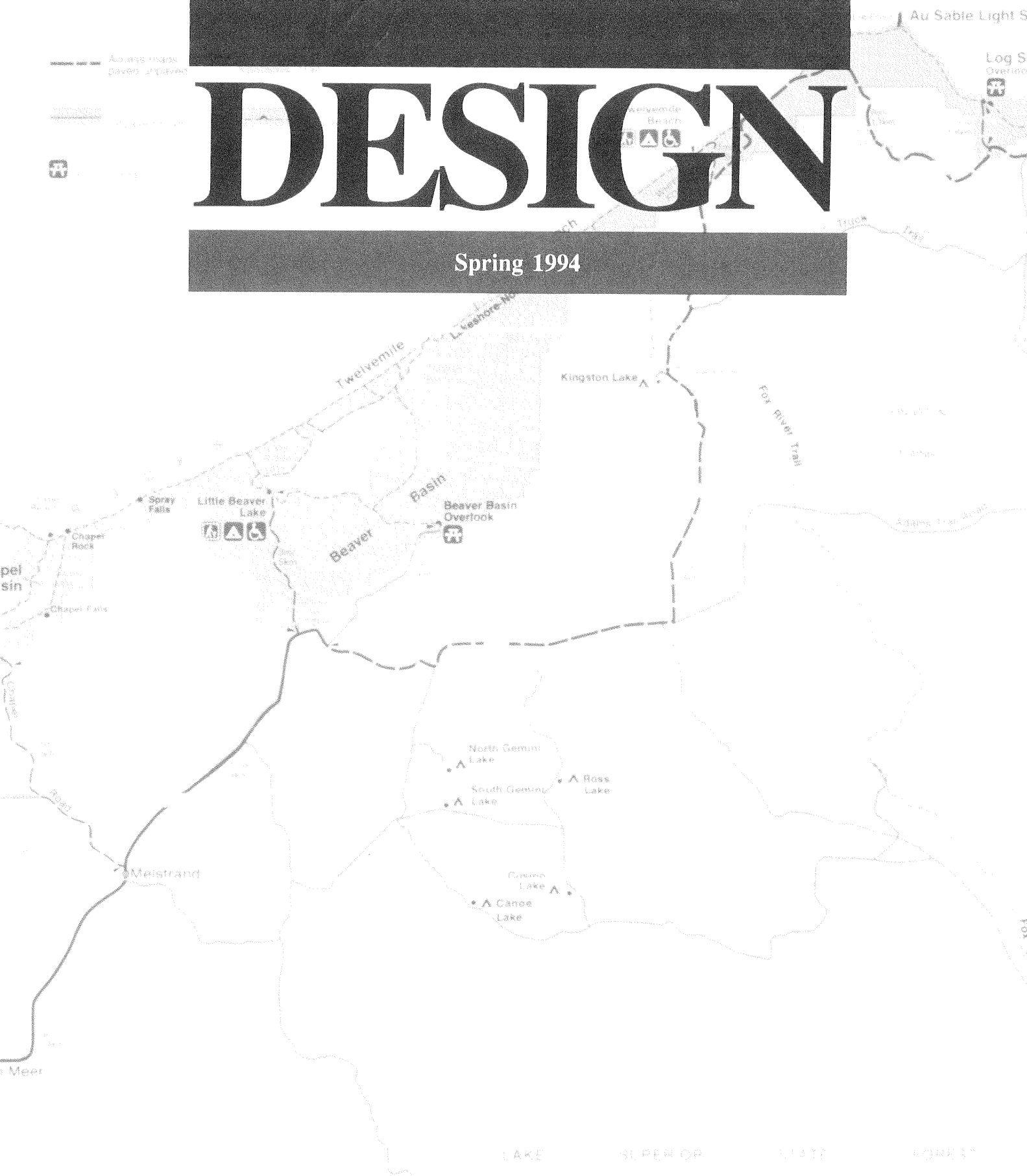
DESIGN

Spring 1994



U.S. Department of the Interior • National Park Service • National Recreation and Park Association

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Spring 1994

A Park Practice Program publication.
The Park Practice Program is a cooperative effort of the National Park Service and the National Recreation and Park Association.

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U.S. Department of the Interior
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The Park Practice Program includes: TRENDS, a quarterly publication on topics of general interest in park and recreation management and programming; GRIST, a quarterly publication on practical solutions to everyday problems in park and recreation operations including energy conservation, cost reduction, safety, maintenance and designs for small structures; DESIGN, a quarterly compendium of plans for park and recreation structures which demonstrate quality design and intelligent use of materials.

The information presented in any of the publications of the Park Practice Program does not reflect an endorsement by the agencies sponsoring the program or by the editors.

Articles, suggestions, ideas and comments are invited and should be sent to the Park Practice Program, National Park Service, P.O. Box 37127, Washington, DC 20013-7127, telephone (202) 343-7067.

The Park Practice Program publications TRENDS, GRIST and DESIGN, plus the yearly Index, are printed on recycled paper.

Dear Readers:

This Spring 1994 issue of DESIGN focuses on a solar well pumphouse structure which also serves as an information kiosk. This practical, multi-purpose structure is located at the National Park Service's Pictured Rocks National Lakeshore in Michigan. It has proven so popular with the staff and visitors that additional ones are being built elsewhere at the lakeshore.

Our special thanks to Facility Manager Chris V. Case who contributed this article, construction drawings and photographs to DESIGN for publication.

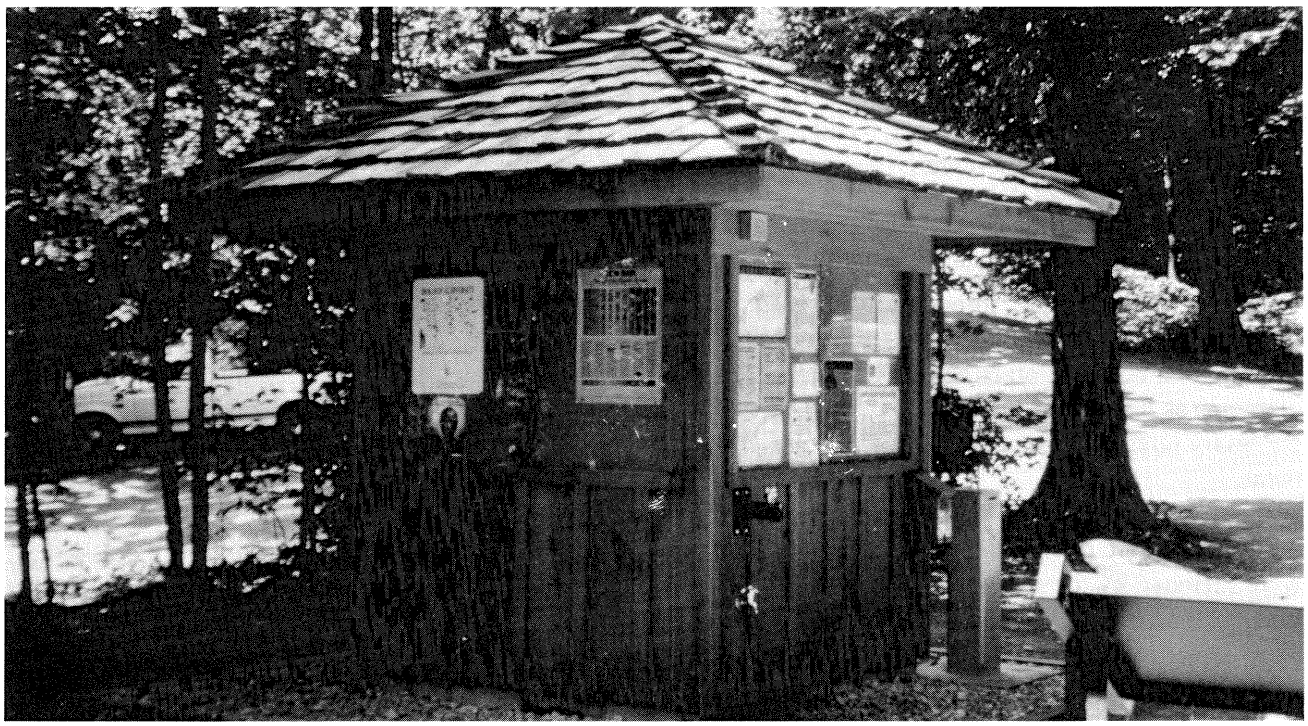
Kathleen A. Pleasant
Managing Editor

All plans contained in DESIGN are presented as guidelines and suggestions, not as blueprints for construction. Before building from any plan, be sure to consult federal, state and local safety and building codes. We particularly recommend your checking building plans for compliance with the National Fire Protection Association's NFPA No. 101, The Life Safety Code.

Also, to assure barrier-free design that permits access for all people, check your plans for compliance with the American National Standards Institute's ANSI A117.1., American National Standard Specifications for Making Buildings and Facilities Accessible To, and Usable By, the Physically Handicapped.

When submitting new materials for DESIGN: We'd like line drawings and several black and white glossy photographs of your structure. The photos should be of good quality and in sharp focus. We can also work with color slides or color photos. However, they will be converted to black and white prior to printing and the quality lessens during the conversion process.

Solar Well Pumphouse/Kiosk



In Fiscal Year 1992, the National Park Service staff at Pictured Rocks National Lakeshore in Michigan, submitted a request to the Midwest Regional office for $32,000. The money would be used to purchase mechanical equipment for the conversion of hand pump water well systems to pressurized chlorinated photovoltaic systems.

The submission of the funding request triggered two concurrent activities undertaken by staff members: (1) a task group was formed to perform an on-site evaluation for facility development and (2) the maintenance division began the process of determining system requirements and developing the design of the necessary components.

Site Evaluation and Structure Selection

The task group was formed, with representatives from each division, and assigned the responsibility of evaluating one campground to develop a plan that would serve as a prototype for the rest of the park's eight water system upgrades. The group immediately recognized this as an excellent opportunity to incorporate the existing scattered visitor information facilities and fixtures found in each campground into one structure.

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Solar Well Pumphouse/Kiosk		Contributed by Chris V. Case Facility Manager Pictured Rocks NL Michigan
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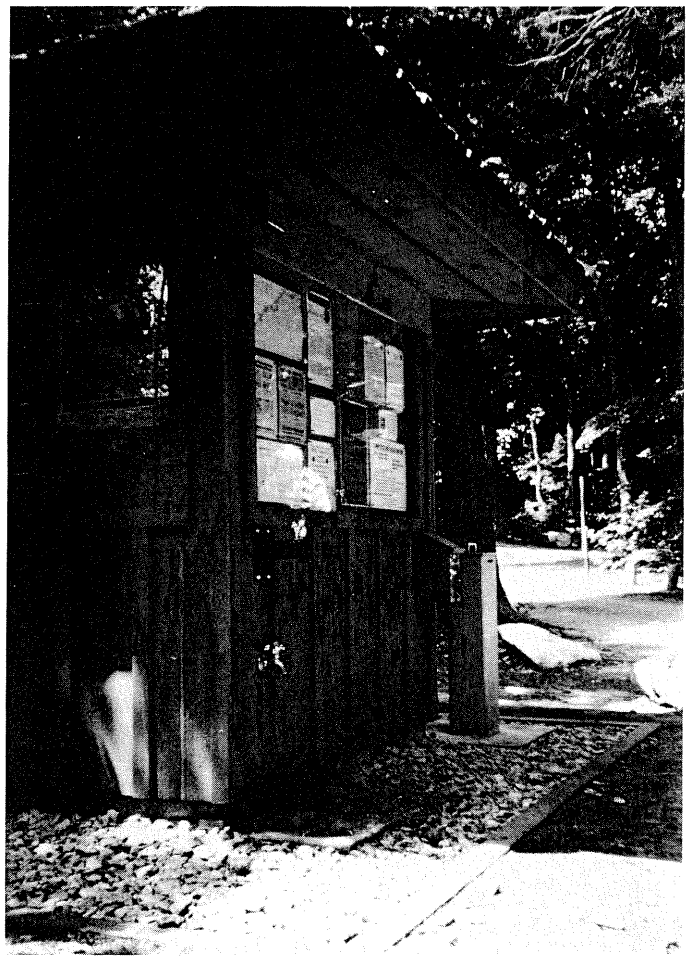
The group reviewed photographs of facilities at Saint Croix National Scenic Riverway (Wisconsin and Minnesota) and Sleeping Bear Dunes National Lakeshore (Michigan) and agreed that a kiosk-type structure should be used that would accommodate campground registration, interpretive messages, necessary camping information, bear and other hazard warnings as well as house the necessary pump and solar equipment.

Several structure configurations were sketched by the seasonal landscape architect assigned to the park through the regional office intern program. The group reviewed the sketches and a square structure with hip roof design was agreed upon. As-built drawings of the project were completed by staff landscape architect Bob Reed.

System Selection and Design

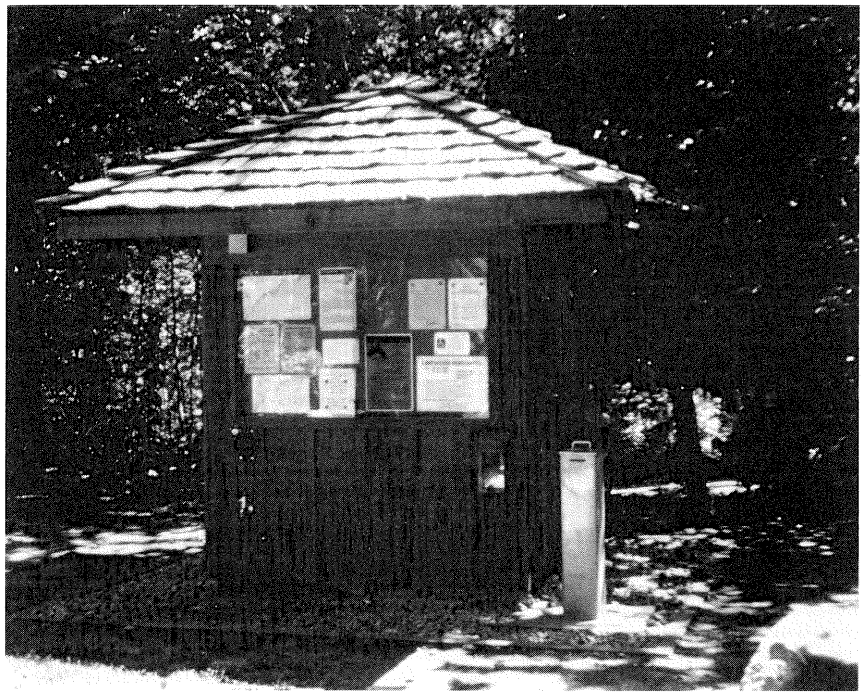
Pictured Rocks maintenance personnel had, over the past several years, researched solar powered water systems that were being used in other park areas. After reviewing several system designs, the park staff met with Cedric Currin of the Currin Corporation of Midland, Michigan, an international developer of photovoltaic systems. Mr. Currin provided technical assistance and recommendations for the design of the solar powered water system for the Little Beaver Lake Campground.



To provide a facility for the equipment, West District Supervisor John Ochman used the criteria recommended by the task group and space requirements needed to house the equipment to design an aesthetically pleasing kiosk/pumphouse that would fit into the Little Beaver and other park campgrounds. The entire park staff then reviewed the design/proposal and their comments were incorporated into a final drawing.

Once funding was received by the park, the approved plans were given to Maintenance Mechanic Gary Vieth, who was assisted by Equipment Operator Brad Bradley in constructing pre-fabricated wall panels and the roof structure in the shop during the winter. The plumbing and electrical panels were also pre-assembled.

Prior to spring opening the hand pump in the campground was removed and the foundation was poured for the new solar water



system facility. The assembly of the pre-fabricated components went relatively quickly, and the system was operational by the opening of the campground. The solar electric panels were mounted on a cedar pole 27.43 m (90-ft.) from the structure.

Structure Materials and Construction

The structure was built using basic framing techniques. Because of the problem with porcupines damaging facilities constructed with laminated woods, the exterior surface used a cedar board and batten design with a metal service entry door and cedar shake hip roof. Three sides of the kiosk have information panels. A fee collection pipe safe was poured into the foundation adjacent to the panel that contains campground information.

Upon completion of the prototype, park staff members evaluated the finished product and have not found any modifications necessary for other units scheduled for construction. The review process allowed the park staff to provide their input and "buy into" the facility. This parkwide effort resulted in a successful improvement to the campground facilities that the entire staff could feel that they had participated in.

With the success of the Little Beaver prototype, the construction of a second unit at the Lower Loop of the Hurricane Campground was accomplished in the spring of 1994. The only modification to the second unit from the prototype was that the power system was increased from a 24-volt to a 48-volt system. This was required because the 24-volt system is limited to a well depth of 12.19 m (40-ft.) and the Hurricane well pump was set at 18.29 m (60-ft.) (A 48-volt system pump can be set to a maximum depth of 30.48 m (100-ft.)) The 48-volt system uses a larger pump, eight batteries instead of four, and requires two collector panels instead of one. The park found that even with somewhat more complex control wiring, the second unit took about 30 percent less time to construct than the prototype.

One more unit is planned for construction at the Upper Hurricane Loop and two others at the Twelvemile Beach Campground this year. Once these are operational, the Lakeshore will have five solar well/kiosk units in place. By replacing hamdpump well systems with closed pressurized and chlorinated systems, the Lakeshore has made significant steps in assuring that safe drinking water is provided to our visitors.

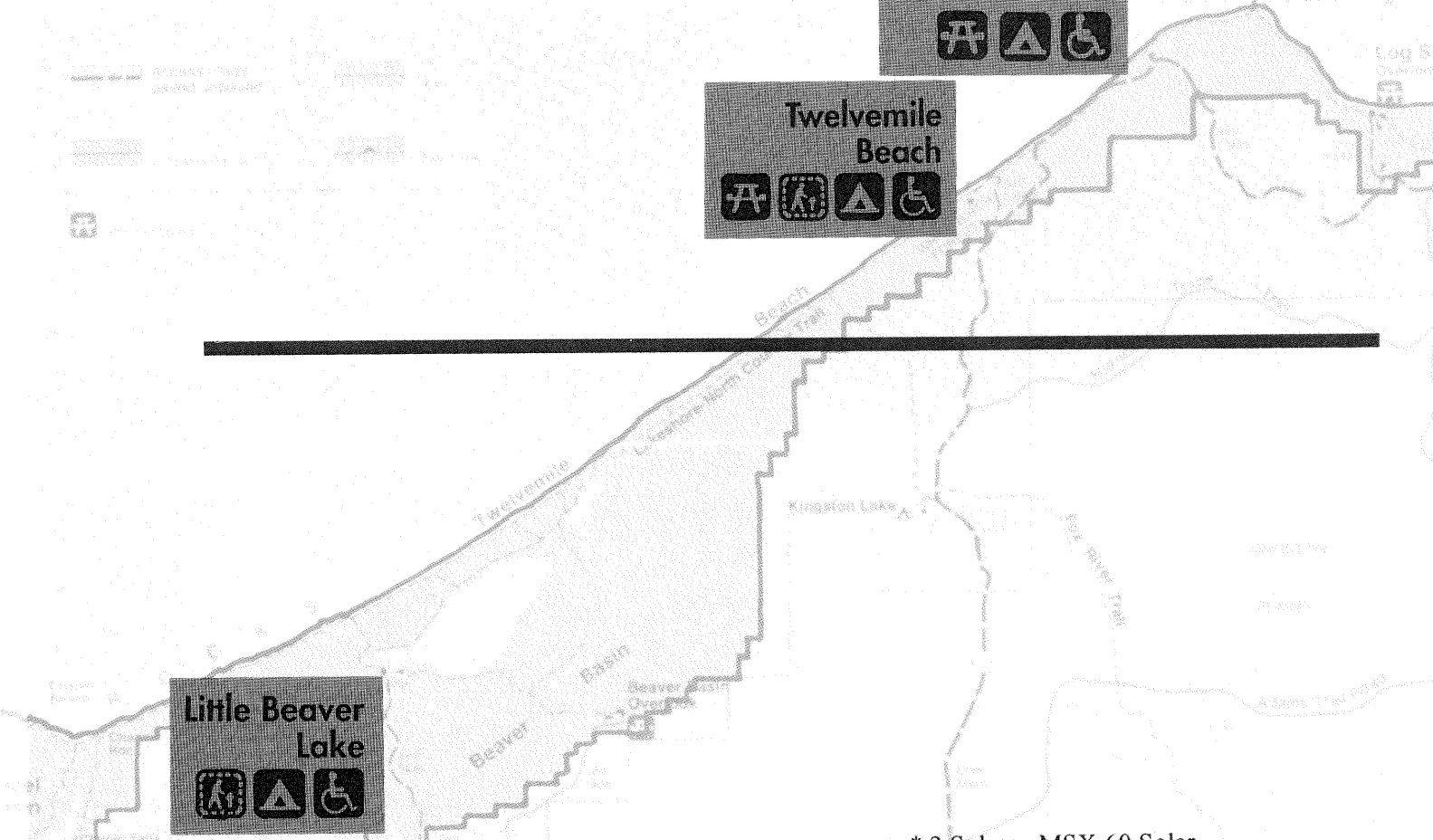
During the 1993 season, the solar-electric pump system operated for 65.8 hours, pumping 21894.82 L (5,784 gal.) at an average rate of 5.55 L (1.465 gal./minute) (water system pressure of 15-25 psi).

Month	Pump Time, Hours	Water pumped, Gallons	Voltage, Volts	Camperdays
May*	7.3	608	N/A	70**
June	12.1	990	27.1	377
July	17.1	1563	27.1	555
August	16.2	1504	26.9	590
September	10.4	917	27.4	384
October	2.4	202	27.3	110
November***	0.0	0	N/A	24
Total	**65.8**	**5784**		**2086**

* Pump system operational starting May 20
** 142 for the total month of May
*** System shut down for the winter on November 1

This pressured closed system can provide 1211.22 L (320 gal.) of chlorinated water per day at this campground. Records show that during the 164 days that the pump was in operation, an average of 10.49 L (2.77 gal.) of water were pumped per camper-day of campground occupancy.

This project was tracked separately using the National Park Service's Maintenance Management Program and as-built drawings were produced by the park's Landscape Architect, Bob Reed.



Technical/Operational Information

Based on the visitation usage at Little Beaver Lake Campground the following equipment was required:

* Currin Series SESP24-1800 Solar-electric pump with Option 207B, 24 volt system

* Flowlight Delta 4500 pump

* 2 Solarex MSX-60 Solar electric panels

* 4 Johnson Controls GC12v100

* Dosatron D1-16 hydraulic-operated disinfection injectors

* Pump timer meter

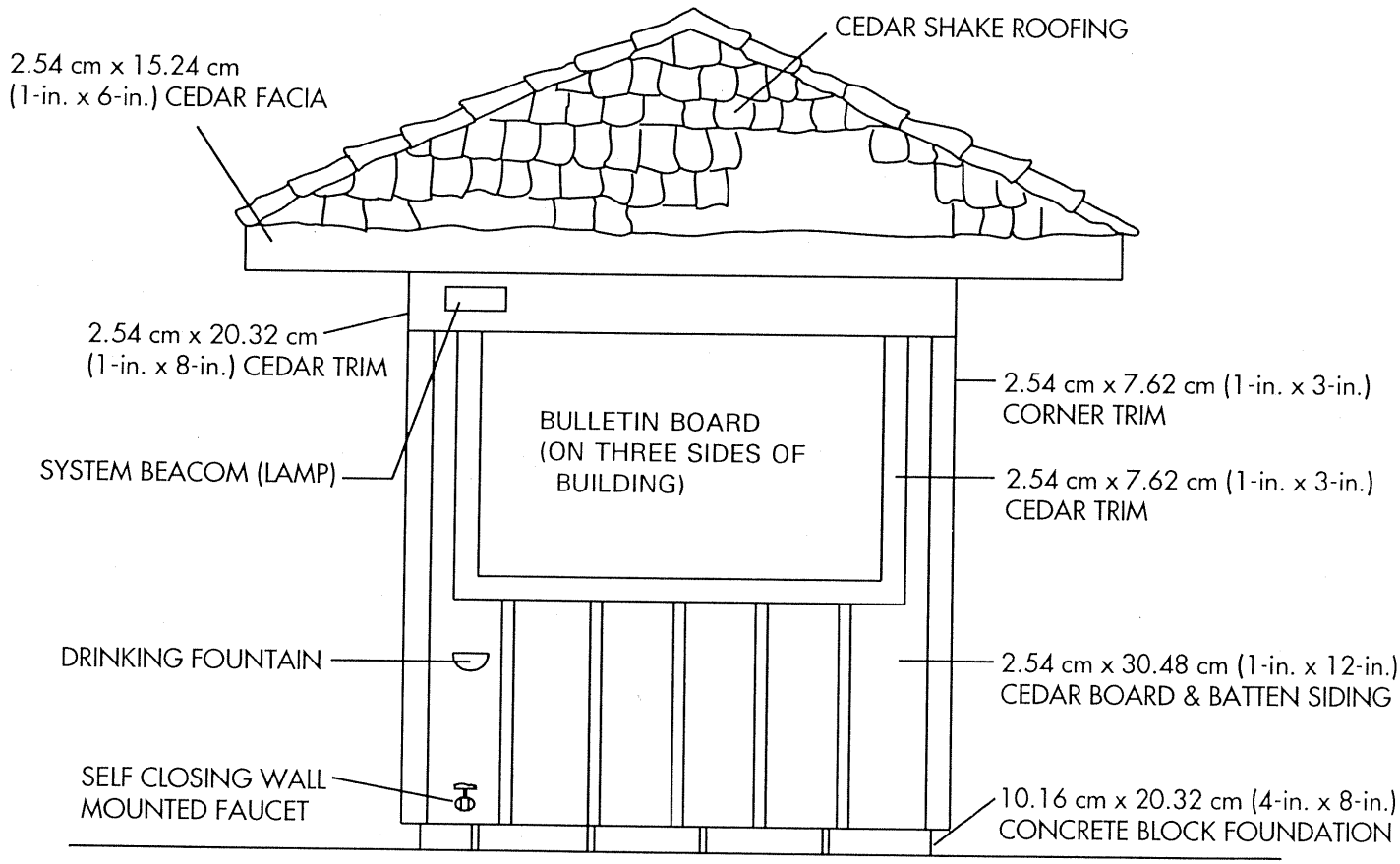
* Digital system voltmeter DVC-200LC

* Bracket for pole-mounting the solar electric panels

* System beacon (lamp) LLR-24v

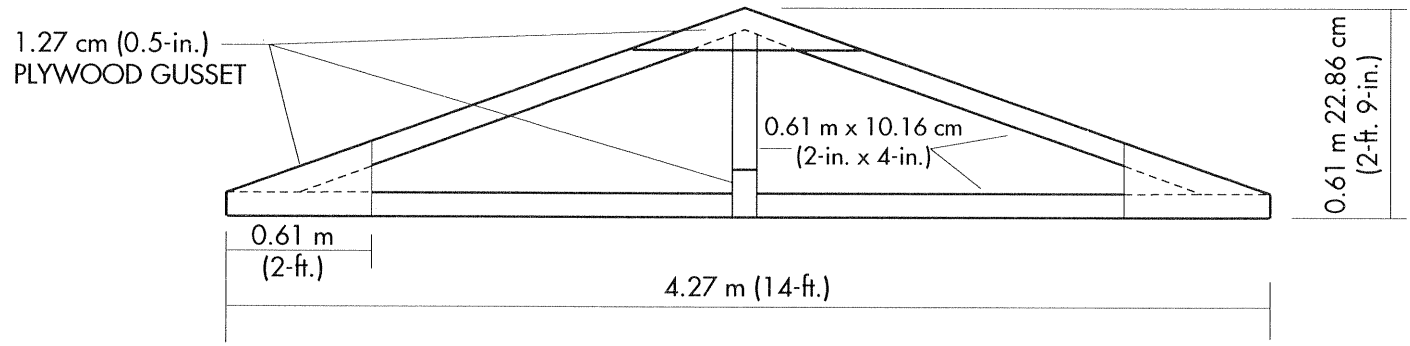
* 80 Meter #102c solar array cable

* Currlum 6000LA/24sps service luminaire



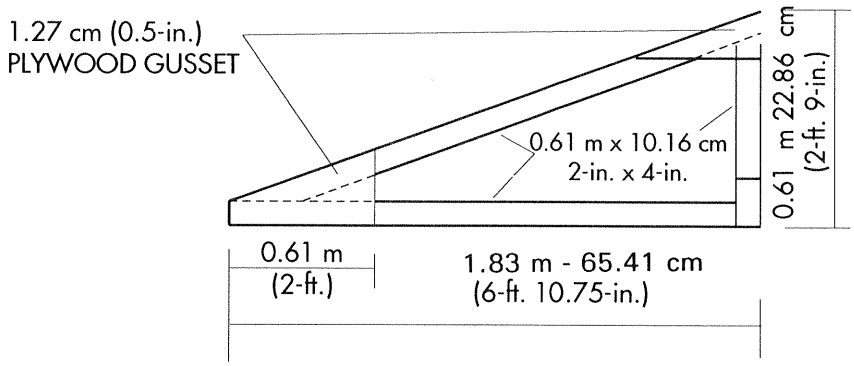
BUILDING ELEVATION

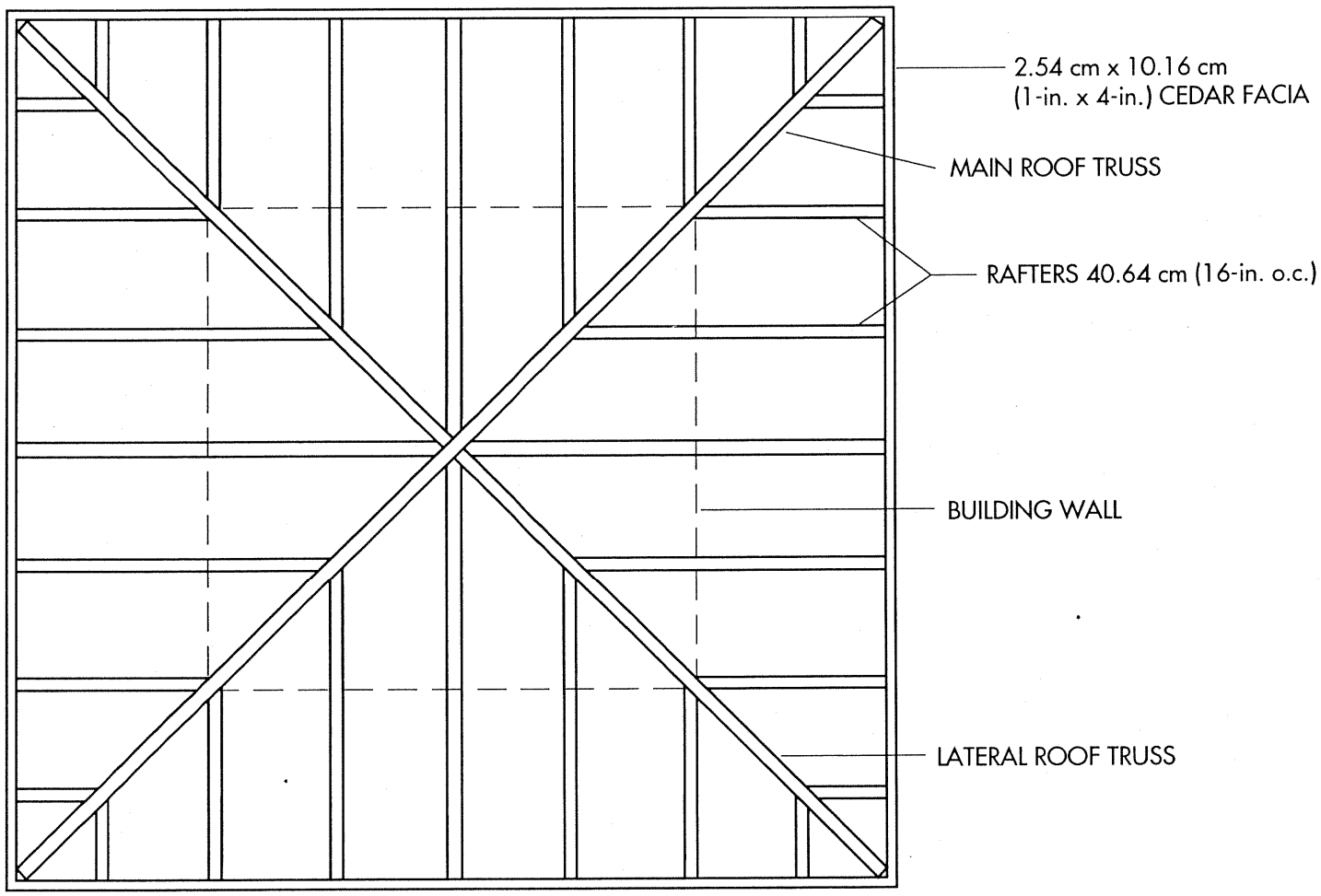
SCALE 0.5-in. = 1-ft.
1.27 cm = 0.30 m



MAIN ROOF TRUSS

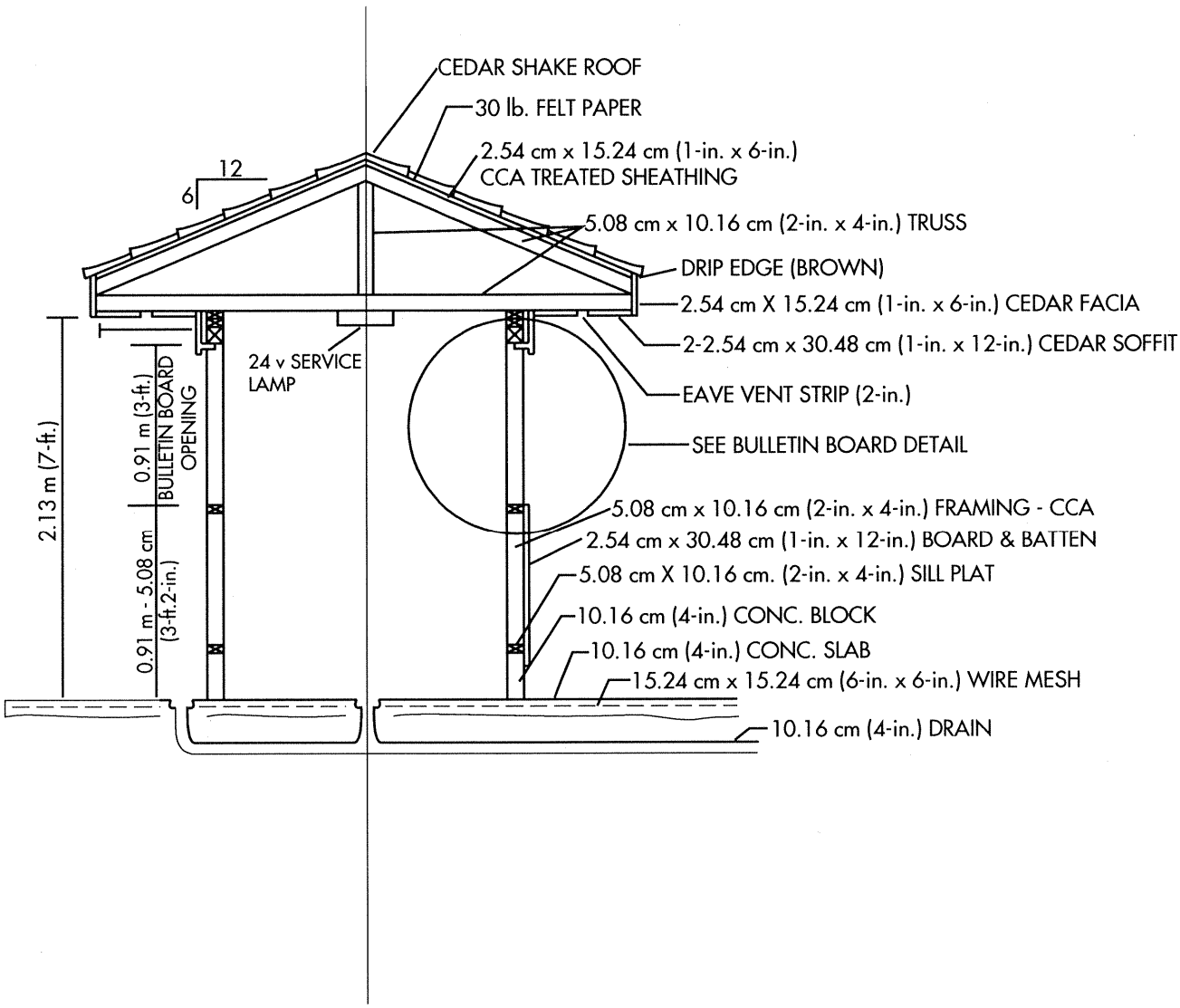
SCALE 0.5-in. = 1-ft.
1.27 cm = 0.30 m



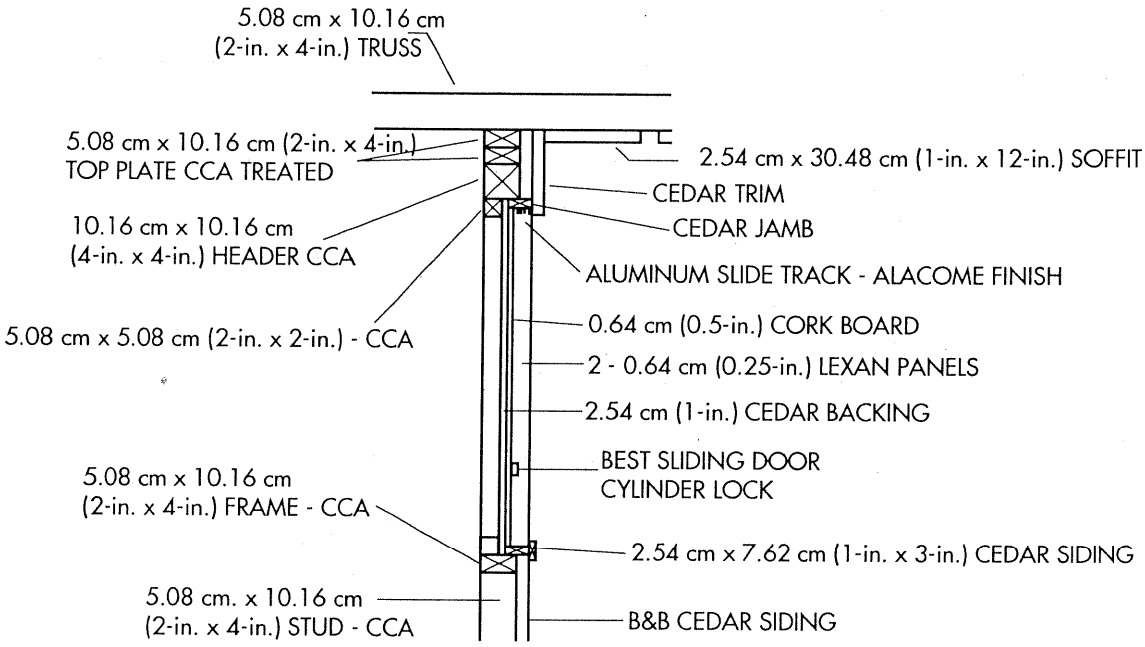


ROOF FRAMING PLAN

SCALE 0.5-in. = 1-ft.
1.27 cm = 0.30 m



Solar Well Pumphouse/Kiosk (cont'd) B-3981

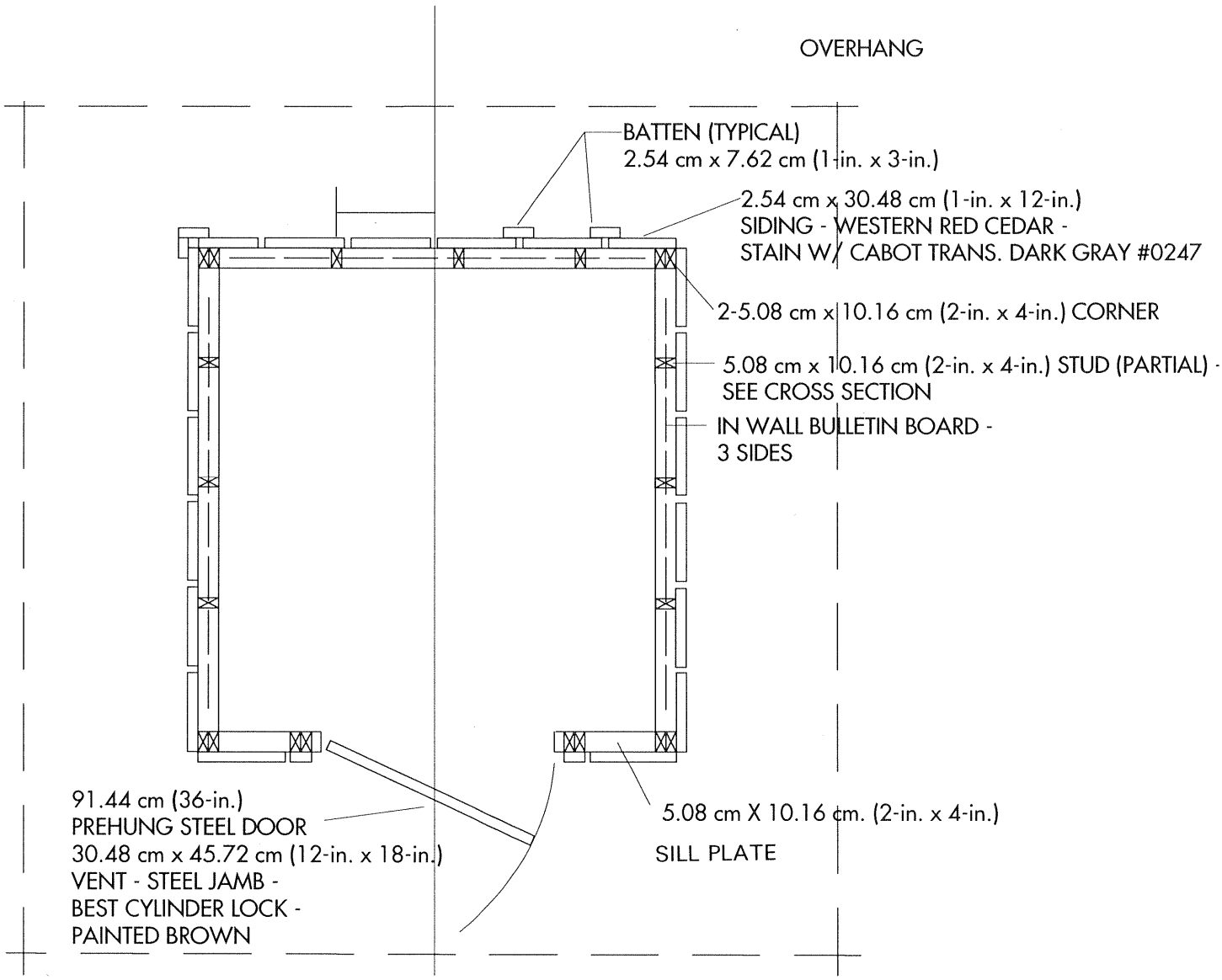


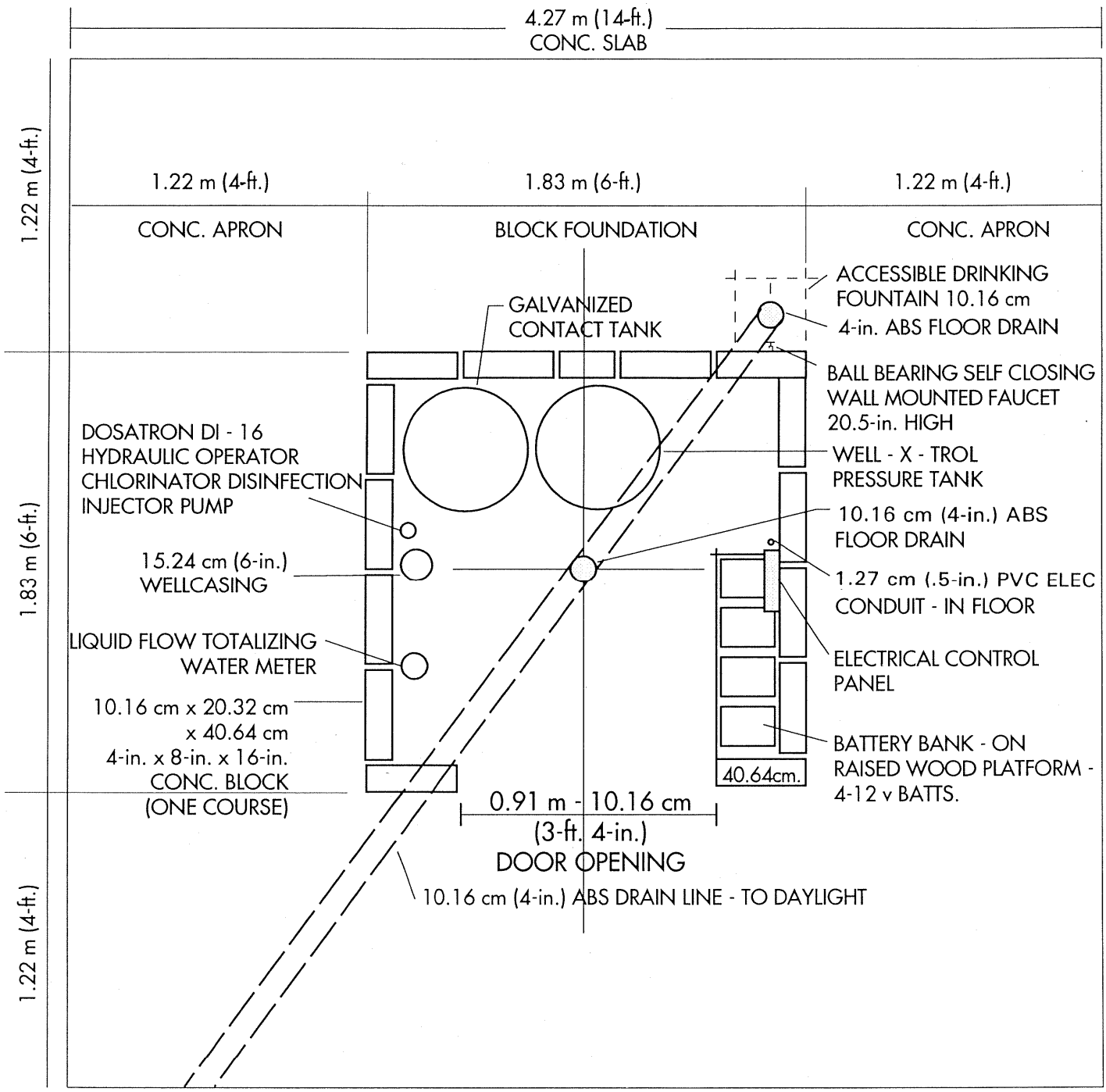
BULLETIN BOARD DETAIL

SCALE 2.54cm. = 0.30m
1in. - 1 ft.

BUILDING CROSS SECTION

SCALE 0.5-in. = 1-ft.
1.27 cm = 0.30 m





Solar Well Pumphouse/Kiosk (cont'd) B-3984